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Soggetti	Elementary particles (Physics) Quantum field theory Mathematical physics Algebraic fields Polynomials Elementary Particles, Quantum Field Theory Mathematical Physics Field Theory and Polynomials
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Note generali	Description based upon print version of record.
Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	Introduction -- Algebraic approach to quantum theory -- Algebraic quantum mechanics -- Causality -- Haag-Kastler axioms -- pAQFT axioms -- LCQFT -- Kinematical structure -- The space of field configurations -- Functionals on the configuration space -- Fermionic field configurations -- Vector fields -- Functorial interpretation -- Classical theory -- Dynamics -- Natural Lagrangians -- Homological characterization of the solution space -- The net of topological Poisson algabras -- Analogy with classical mechanics -- Deformation quantization -- Star products -- The star product on the space of multivector fields -- Kähler structure -- Interaction -- Outline of the approach -- Scatering matrix and time ordered products -- Renormalization group -- Interacting local nets -- Explicit construction -- Gauge theories -- Classical gauge theory -- Gauge-fixing -- BV formalism -- Effective quantum gravity -- From LCQFT to quantum gravity -- Dynamics and symmetries -- Linearized theory --

Quantization -- Relational observables -- Background independence.

Sommario/riassunto

Perturbative Algebraic Quantum Field Theory (pAQFT), the subject of this book, is a complete and mathematically rigorous treatment of perturbative quantum field theory (pQFT) that doesn’t require the use of divergent quantities. We discuss in detail the examples of scalar fields and gauge theories and generalize them to QFT on curved spacetimes. pQFT models describe a wide range of physical phenomena and have remarkable agreement with experimental results. Despite this success, the theory suffers from many conceptual problems. pAQFT is a good candidate to solve many, if not all of these conceptual problems. Chapters 1-3 provide some background in mathematics and physics. Chapter 4 concerns classical theory of the scalar field, which is subsequently quantized in chapters 5 and 6. Chapter 7 covers gauge theory and chapter 8 discusses QFT on curved spacetimes and effective quantum gravity. The book aims to beaccessible researchers and graduate students interested in the mathematical foundations of pQFT are the intended audience.